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[REDACTED] EXAMINER

VANOY, TIMOTHY C.

[REDACTED] ART UNIT [REDACTED] PAPER NUMBER

1754

8

DATE MAILED: 08/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.	Applicant(s)	
10-027,192	KHARE	
Examiner	Group Art Unit	
VANOY	1754	

**—The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE THREE MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

THE AMENDMENT MAILED ON JULY 18 2003

Responsive to communication(s) filed on \_\_\_\_\_

This action is FINAL.

Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 1 1; 453 O.G. 213.

### Disposition of Claims

Claim(s) 1 - 55

is/are pending in the application.

Of the above claim(s) \_\_\_\_\_

is/are withdrawn from consideration.

Claim(s) \_\_\_\_\_

is/are allowed.

Claim(s) 1 - 55

is/are rejected.

Claim(s) \_\_\_\_\_

is/are objected to.

Claim(s) \_\_\_\_\_

are subject to restriction or election requirement

### Application Papers

The proposed drawing correction, filed on \_\_\_\_\_ is  approved  disapproved.

The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner

The specification is objected to by the Examiner.

The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. § 119 (a)-(d)

Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).

All  Some\*  None of the:

Certified copies of the priority documents have been received.

Certified copies of the priority documents have been received in Application No. \_\_\_\_\_

Copies of the certified copies of the priority documents have been received

in this national stage application from the International Bureau (PCT Rule 17.2(a))

\*Certified copies not received: \_\_\_\_\_

### Attachment(s)

Information Disclosure Statement(s), PTO-1449, Paper No(s). \_\_\_\_\_

Interview Summary, PTO-413

Notice of Reference(s) Cited, PTO-892

Notice of Informal Patent Application, PTO-152

Notice of Draftsperson's Patent Drawing Review, PTO-948

Other \_\_\_\_\_

## Office Action Summary

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

The person having "ordinary skill in the art" has the capability of understanding the scientific and engineering principles applicable to the claimed invention. The references of record in this application reasonably reflect this level of skill.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 53 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Pat. 4,634,515 in view of U. S. Pat. 6,444,118 B1.

The gasoline and diesel of Applicants' claims 53 and 54 are not expected to be unobviously different from the gasoline and/or diesel worked up from the desulfurized naptha that the process of U. S. Pat. 4,634,515 produces (please see col. 1 Ins. 17-18 and claim 1 in U. S. Pat. 4,634,515), consistent with the discussion of the *In re Thorpe* 777 F.2d 695,698, 227 USPQ 964, 966 (Fed. Cir. 1985) court decision set forth in section 2113 in the MPEP (8<sup>th</sup> ed.).

Note that col. 4 Ins. 3-7 in U. S. Pat. 4,634,515 reports that the sulfur compound content in the product leaving the hydrofiner ranges from about 1 to 5 ppm, in a manner meeting the limitation "said product comprises less than 80 ppm sulfur by weight".

The difference between the applicants' claims and U. S. Pat. 4,634,515 is that applicants' claims 53 and 54 set forth that "the concentration of olefinic compounds in said product is substantially similar to the concentration of olefinic compounds in the hydrocarbon-containing feed", wherein the paragraph bridging pgs. 28 and 29 in the applicants' specification explains that a relatively large excess of hydrogen is added to the sulfur compound-contaminated hydrocarbon feed in the desulfurization zone (i. e. a hydrogen to hydrocarbon mole ratio ranging from 0.1 to 10:1) so that the hydrogen interferes with a reacting of (i. e. a reacting between?) the olefinic and aromatic compounds present in the hydrocarbon feed.

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Col. 1 ln. 44 to col. 2 ln. 21 in U. S. Pat. 6,444,118 B1 discloses that cracked naptha contains a high octane number due to the amount of olefins and aromatic compounds contained therein (please see col. 1 lns. 44-49 in U. S. Pat. 6,444,118 B1, specifically). U. S. Pat. 6,444,118 B1 proceeds to explain that during the desulfurization process, "copious quantities" of hydrogen are added to the sulfur compound-contaminated feed so that the hydrogen *not only* reacts with the organic sulfur compounds to reduce them into hydrogen sulfide (which may be removed in a downstream step) *but also* saturates the olefins and aromatic compounds in the feed (please see col. 2 lines 12-15 in U. S. Pat. 6,444,118 B1). Evidently and presumably, this saturation of the olefins and aromatics would also prevent them from reacting together – thereby retaining the octane of the hydrocarbon feed.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made *to set forth that* "the concentration of olefinic compounds in said product is substantially similar to the concentration of olefinic compounds in the hydrocarbon-containing compound", as set forth in applicants' claims 53 and 54, because the disclosure set forth in col. 1 ln. 44 to col. 2 ln. 21 in U. S. Pat. 6,444,118 B1 clearly teaches that the excess hydrogen present during the desulfurization step (the hydrodesulfurization step alluded to in col. 1 ln. 55 in U. S. Pat. 4,634,515) saturates the olefins and the aromatic compounds present in the hydrocarbon feed, *thereby* fairly suggesting that any reaction is prevented between the olefins and the aromatics so that *it can be said that* "the concentration of olefinic compounds in said product is

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substantially similar to the concentration of olefinic compounds in the hydrocarbon-containing compound" (i. e. hydrocarbon feed).

Claims 1-17 are rejected under 35 U.S.C. 103(a) as being obvious over U. S.

Pat. 5,726,117 in view of U. S. Pat. 4,634,515.

Example 1 in columns 5 and 6 in U. S. Pat. 5,726,117 describes what appears to be an obvious variation of the same sorbent made by:

mixing calcium silicate with zinc oxide in a mix-muller;

mixing the calcium silicate/zinc oxide mixture with an aqueous solution of alumina;

drying and calcining the resulting wet paste at 635 oC for 1 hour;

granulating the dried, calcined product to produce particles;

mixing the particles with an aqueous solution of nickel nitrate so as to impregnate the particles with nickel nitrate;

drying and calcining the nickel-impregnated particles 635 oC for 1 hour, and

steam-treating the nickel-impregnated particles with steam-containing gas at 760 oC for 24 hours to produce what appears to be a stream-treated sorbent comprising zinc oxide and nickel oxide supported alumina, as set forth in at least Applicants' claims 1-6, 8, 12, 13 and 16.

The difference between the Applicants' claims and U. S. Pat. 5,726,117 is that Applicants' claims 1, 3, 4, 6, 7, 8, 13 and 16 requires the presence of a "reduced

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valence" promoter (i. e. a promoter having a valence less than 2 or 0, such as (elemental or reduced) nickel).

U. S. Pat. 4,634,515 is directed to the same art of removing hydrogen sulfide out of a fluid via contact with a sorbent, however col. 5 Ins. 4 and 5 reports that the sorbent has been subjected to a pre-reduction step at 700 to 800 oF (with hydrogen gas: please also see col. 6 ln. 36) and col. 7 Ins. 10-20 reports that when the nickel is present in the reduced or metallic state, there is improvement in the amount of sulfur sorbed by the sorbent.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process for making the sorbent described in U. S. pat. 5,726,117 by including the hydrogen reduction step mentioned in col. 5 Ins. 4 and 5 and col. 6 line 36 in U. S. Pat. 4,634,515 so as to result in a sorbent having a "reduced valence" promoter, in the manner required in the scope of Applicants' claims 1, 3, 4, 6, 7, 8, 13 and 16, because of the taught advantage of increasing the amount of sulfur sorbed by the sorbent with the promoter in a chemically "reduced valence" state, as taught in col. 7 lines 10-20 in U. S. Pat. 4,634,515.

While Example 1 in U. S. Patent 5,726,117 does not set forth what the weight percentages are for the components present in that sorbent are, col. 1 ln. 60 to col. 2 ln. 8 in U. S. Pat. 5,726,117 reports that the zinc oxide is present in an amount that may range from 10 to 90 weight percent of the composition; col. 2 Ins. 35-44 in U. S. Pat. 5,726,117 reports that the colloidal metal oxide (i. e. the silica) may be present in an amount that may range from 1 to 30 weight percent of the composition; col. 2 Ins. 55-61

in U. S. Pat. 5,726,117 reports that the metal oxide may be present in the composition in an amount that may range from 5 to 95 weight percent of the composition, and col. 3 Ins. 44-54 in U. S. Pat. 5,726,117 reports that the amount of Group VIII metal oxide promoter may be present in the composition in the range of 0.1 to 20 weight percent of the composition - in a manner that is not seen to be distinct from the weight percent limitations of Applicants' claim 7.

Note that Example 1 in U. S. Pat. 5,726,117 reports that particles were removed that had mesh sizes outside of the 50 mesh (280 micrometers) to 200 mesh (74 micrometers) particle size range (i. e. particles having a size ranging from 74 to 280 micrometers were chosen), in a manner that is not seen to be distinct from the limitations of Applicants' claims 14 and 15.

The difference between the Applicants' claims and U. S. Pat. 5,726,117 is that claims 9-11 set forth that the sorbent has been treated under such conditions that some zinc silicate or zinc aluminate has been formed.

Col. 2 Ins. 61-68 in U. S. Pat. 5,726,117 reports that the metal oxide component (to include zinc silicate or zinc aluminate: please also see col. 2 Ins. 52-55 in U. S. Pat. 5,726,117) can be formed in-situ during the preparation of the sorbent.

It would have been obvious to one of ordinary skill in the art at the time the invention was made *to further describe* that some zinc silicate and/or zinc titanate is formed during the method of making the sorbent described in (at least) Example 1 in U. S. Pat. 5,726,117, in the manner set forth in at least Applicants' claims 9-11, because the disclosure set forth in col. 2 Ins. 61-68 in U. S. Pat. 5,726,117 fairly suggests this.

The difference between the Applicants' claims and U. S. Pat. 5,726,117 is that Applicants' claim 17 describes the composition as having a 5 hour attrition percentage value of less than 30 percent, however it is submitted that this difference would have been obvious to one of ordinary skill in the art at the time the invention was made because it is reasonably expected that the same sorbent will inherently have the same attrition resistance.

Claims 18-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Pat. 5,726,117 in view of U. S. Pat. 4,634,515.

Example 1 in columns 5 and 6 in U. S. Pat. 5,726,117 describes what appears to be an obvious variation of the same sorbent made by:

mixing calcium silicate with zinc oxide in a mix-muller;

mixing the calcium silicate/zinc oxide mixture with an aqueous solution of alumina;

drying and calcining the resulting wet paste at 635 oC for 1 hour;

granulating the dried, calcined to produce particles;

mixing the particles with an aqueous solution of nickel nitrate so as to impregnate the particles with nickel nitrate;

drying and calcining the nickel-impregnated particles 635 oC for 1 hour, and

steam-treating the nickel-impregnated particles with steam-containing gas at 760 oC for 24 hours to produce what appears to be a stream-treated sorbent comprising

zinc oxide and nickel oxide supported alumina, as set forth in at least Applicants' claims 18, 19, 22, 26-29, 32 and 33.

The difference between the Applicants' claims and U. S. Pat. 5,726,117 is that claims 20 and 21 set forth that the sorbent has been treated under conditions that some zinc silicate or zinc aluminate has been formed.

Col. 2 Ins. 61-68 in U. S. Pat. 5,726,117 reports that the metal oxide component (to include zinc silicate or zinc aluminate: please also see col. 2 Ins. 52-55 in U. S. Pat. 5,726,117) can be formed in-situ during the preparation of the sorbent.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to *further describe* that some zinc silicate and/or zinc titanate is formed during the method of making the sorbent described in (at least) Example 1 in U. S. Pat. 5,726,117, in the manner set forth in at least Applicants' claims 20 and 21, because the disclosure set forth in col. 2 Ins. 61-68 in U. S. Pat. 5,726,117 fairly suggests this.

The difference between the Applicants' claims and U. S. Pat. 5,726,117 is that Applicants' claim 18 step (e) requires the additional step of reducing the sorbent to provide a sorbent having a reduced-valence promoter and Applicants' claims 23, 24, 25, 30 and 31 define the promoter as nickel and define the valence of the promoter as being less than 2 or 0.

U. S. Pat. 4,634,515 is drawn to the same art of removing hydrogen sulfide out of fluids via contact with a nickel-supported-on-alumina sorbent, specifically for removing hydrogen sulfide out of naphtha that may be used for the production of high octane

gasoline (please see claim 1 and col. 1 Ins. 15-18 in U. S. Pat. 4,634,515). U. S. Pat. 4,634,515 reports that a nickel-based sorbent that has been treated with hydrogen at 700 to 800 oC (please see col. 5 Ins. 4 and 5 and col. 6 Ins. 35-36 in U. S. Pat. 4,635,515) exhibits an improvement in the amount of sulfur sorbed when at least 60% of the nickel has been reduced to the metallic state (i. e. zero valence state).

It would have been obvious to one of ordinary skill in the art at the time the invention was made *to modify* the process for making the sorbent described in U. S. Pat. 5,726,117 by *including* the reducing step taught in col. 5 Ins. 4 and 5 and col. 6 Ins. 35-36 in U. S. Pat. 5,726,117, in the manner required by Applicants' claims 18, 23, 24, 25, 30 and 31, *because* of the expected advantage of removing even more sulfur component out of the hydrocarbon fluid being treated, as fairly suggested in col. 6 Ins. 35-36 in U. S. Pat. 4,634,515.

Claims 34-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Pat. 4,634,515 in view of U. S. Pat. 5,726,117 and further in view of U. S. Pat. 6,444,118 B1.

Examples 3 and 4 in U. S. Pat. 4,634,515 describe an obvious variation of the same method for removing hydrogen sulfide out of a hydrocarbon fluid, by:

passing a hydrogen sulfide-contaminated naphtha through a bed of reduced nickel-based sorbent at a temperature of 400 oF (204 oC) and a pressure of 275 psig to produce a sulfur-laden sorbent and a desulfurized hydrocarbon fluid;

separating the desulfurized hydrocarbon fluid from the sulfur-laden sorbent (please note the passage of the hydrocarbon fluid through the "sulfur trap" illustrated in the figure shown in U. S. Pat. 4,634,515);

subjecting the sulfur-laden sorbent to a nitrogen gas containing 2% oxygen at a temperature of 750 oF (399 oC), and

subjecting the sorbent to hydrogen gas, evidently at the same temperature range of 700 to 800 oF (371 to 427 oC) mentioned in col. 5 Ins. 4 and 5 in U. S. Pat. 4,634,515 to produce what appears to be a regenerated sorbent ready to resume treatment of hydrogen sulfide-contaminated hydrocarbon fluids, as set forth in Applicants' claims 34, 36, 40-50, 53 and 54.

The difference between the Applicants' claims and U. S. Pat. 4,634,515 is that Applicants' claim 34 step (a) requires the use of a sorbent having a steam-treated support (whereas there is nothing in U. S. Pat. 4,634,515 teaching or suggesting the use of a steam-treated support for the sorbent).

U. S. Pat. 5,726,117 is directed to the same art of removing hydrogen sulfide out of a fluid via contact with a zinc oxide-based sorbent, wherein col. 7 Ins. 25-33 reports that the sorbent that has been subjected to steam treatment exhibits superior sulfur loading.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to *modify* the process described in U. S. Pat. 4,634,515 by *subjecting* the sorbent to a preliminary step of steam treatment mentioned in (for example) col. 5 Ins. 47-50 in U. S. Pat. 5,726,117, in the manner required in at least

Applicants' claim 34, because the of the expected advantage of the steam-treated sorbent to remove even more hydrogen sulfide out of the fluid being treated, as fairly suggested in col. 7 Ins. 25-33 in U. S. Pat. 5,726,117.

The difference between the Applicants' claims and U. S. Pat. 4,634,515 is that Applicants' claims 35 and 37-39 report the presence of zinc oxide (claim 35) and/or zinc silicate (claim 38) and/or zinc titanate (claim 39).

Col. 1 ln. 64 and col. 2 Ins. 61-67 in U. S. Pat. 5,726,117 reports that the hydrogen sulfide-removal sorbent comprises zinc oxide and that some of the zinc oxide may react with another component in-situ (for example, silica) to produce zinc silicate.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process and composition of U. S. Pat. 4,634,515 by including the zinc components used in the sorbent of U. S. Pat. 5,726,117, in the manner required by at least Applicants' claims 35 and 37-39, because the disclosure of U. S. Pat. 5,726,117 as a whole fairly suggests superior hydrogen sulfide-removal from a fluid by using a sorbent containing zinc components and nickel components supported on alumina.

Further, note that no distinction is seen or has been shown between the weight percent limitations of Applicants' claim 37 and the weight percents of the same components reported in col. 2 Ins. 2-8; Ins. 37-44 and Ins. 55-58 and col. 3 Ins. 44-54 in U. S. Pat. 5,726,117.

The difference between the Applicants' claims and U. S. Pat. 4,634,515 is that Applicants' claims 51-54 call for the desulfurization of cracked gasoline (claim 51) or

diesel (claim 52), whereas the process described in U. S. Pat. 4,634,515 treats naptha (please see claim 1 in U. S. Pat. 4,634,515) which may be used to make gasoline (please also see col. 1 Ins. 17-18 in U. S. Pat. 4,634,515), however it is submitted that this difference would have been obvious to one of ordinary skill in the art at the time the invention was made because the end result of obtaining a desulfurized product (i. e. gasoline or diesel) is expected to be the same - regardless of whether or not the naptha feed was desulfurized (as in the process described in U. S. Pat. 4,634,515) or the gasoline or diesel product from the naptha feed was desulfurized (as in Applicants' claims 51 and 52): please see the discussion of the *In re Burhans* 154 F.2d 690, 69 USPQ 330 (CCPA 1946) court decision set forth in section 2144.04(IV)(C) in the MPEP (8<sup>th</sup> ed.).

Note that col. 4 Ins. 3-7 in U. S. Pat. 4,634,515 reports that the sulfur compound content in the product leaving the hydrofiner ranges from about 1 to 5 ppm, in a manner meeting the limitation "said product comprises less than 80 ppm sulfur by weight".

The difference between the applicants' claims and U. S. Pat. 4,634,515 is that applicants' claims 53 and 54 set forth that "the concentration of olefinic compounds in said product is substantially similar to the concentration of olefinic compounds in the hydrocarbon-containing feed", and, additionally, applicants' claim 55 explains that a relatively large excess of hydrogen is added to the sulfur compound-contaminated hydrocarbon feed in the desulfurization zone (i. e. a hydrogen to hydrocarbon mole ratio ranging from 0.1 to 10:1) so that the hydrogen interferes with a reacting of (i. e. a

reacting between?) the olefinic and aromatic compounds present in the hydrocarbon feed.

Col. 1 ln. 44 to col. 2 ln. 21 in U. S. Pat. 6,444,118 B1 discloses that cracked naptha contains a high octane number due to the amount of olefins and aromatic compounds contained therein (please see col. 1 lns. 44-49 in U. S. Pat. 6,444,118 B1, specifically). U. S. Pat. 6,444,118 B1 proceeds to explain that during the desulfurization process, "copious quantities" of hydrogen are added to the sulfur compound-contaminated feed so that the hydrogen *not only* reacts with the organic sulfur compounds to reduce them into hydrogen sulfide (which may be removed in a downstream step) *but also* saturates the olefins and aromatic compounds in the feed (please see col. 2 lines 12-15 in U. S. Pat. 6,444,118 B1). Evidently and presumably, this saturation of the olefins and aromatics would also prevent them from reacting together – thereby retaining the octane of the hydrocarbon feed.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made *to set forth that* "the concentration of olefinic compounds in said product is substantially similar to the concentration of olefinic compounds in the hydrocarbon-containing compound", as set forth in applicants' claims 53 and 54, because the disclosure set forth in col. 1 ln. 44 to col. 2 ln. 21 in U. S. Pat. 6,444,118 B1 clearly teaches that the excess hydrogen present during the desulfurization step (the hydrodesulfurization step alluded to in col. 1 ln. 55 in U. S. Pat. 4,634,515) saturates the olefins and the aromatic compounds present in the hydrocarbon feed, *thereby* fairly suggesting that any reaction is prevented between the olefins and the aromatics *so that*

*it can be said that "the concentration of olefinic compounds in said product is substantially similar to the concentration of olefinic compounds in the hydrocarbon-containing compound" (i. e. hydrocarbon feed).*

### ***Response to Arguments***

The applicants' arguments submitted in their amendment date-stamped July 22, 2003 (paper no. 7) have been fully considered but they are not persuasive.

a) *The applicants argue that their present invention in claims 53 and 54 sets forth a gasoline or diesel fuel that is patentably distinct from what is disclosed in U. S. Pat. 4,634,515. Pg. 24 Ins. 13-19 in the specification sets forth that the sulfur compound content in the hydrocarbon fuel is less than 80 ppm sulfur compound by weight. Pg. 28 Ins. 17 to pg. 29 ln. 4 in the applicants' specification sets forth that the addition of hydrogen interferes with (i. e. prevents?) any possible reaction of the olefinic and aromatic compounds.*

The limitation in applicants' claims 53 and 54 that the sulfur compound content is less than 80 ppm is noted, however note that col. 4 Ins. 3-7 in U. S. Pat. 4,634,515 reports that the sulfur compound content in the product leaving the hydrofiner ranges from about 1 to 5 ppm, in a manner meeting the limitation "said product comprises less than 80 ppm sulfur by weight" set forth in applicants' claims 53 and 54.

The difference between the applicants' claims and U. S. Pat. 4,634,515 is that applicants' claims 53 and 54 set forth that "the concentration of olefinic compounds in said product is substantially similar to the concentration of olefinic compounds in the

hydrocarbon-containing feed", and, additionally, applicants' claim 55 explains that a relatively large excess of hydrogen is added to the sulfur compound-contaminated hydrocarbon feed in the desulfurization zone (i. e. a hydrogen to hydrocarbon mole ratio ranging from 0.1 to 10:1) so that the hydrogen interferes with a reacting of (i. e. a reacting between?) the olefinic and aromatic compounds present in the hydrocarbon feed.

Col. 1 ln. 44 to col. 2 ln. 21 in U. S. Pat. 6,444,118 B1 discloses that cracked naptha contains a high octane number due to the amount of olefins and aromatic compounds contained therein (please see col. 1 lns. 44-49 in U. S. Pat. 6,444,118 B1, specifically). U. S. Pat. 6,444,118 B1 proceeds to explain that during the desulfurization process, "copious quantities" of hydrogen are added to the sulfur compound-contaminated feed so that the hydrogen *not only* reacts with the organic sulfur compounds to reduce them into hydrogen sulfide (which may be removed in a downstream step) *but also* saturates the olefins and aromatic compounds in the feed (please see col. 2 lines 12-15 in U. S. Pat. 6,444,118 B1). Evidently and presumably, this saturation of the olefins and aromatics would also prevent them from reacting together – thereby retaining the octane of the hydrocarbon feed.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made *to set forth that* "the concentration of olefinic compounds in said product is substantially similar to the concentration of olefinic compounds in the hydrocarbon-containing compound", as set forth in applicants' claims 53 and 54, because the disclosure set forth in col. 1 ln. 44 to col. 2 ln. 21 in U. S. Pat. 6,444,118 B1

clearly teaches that the excess hydrogen present during the desulfurization step (the hydrodesulfurization step alluded to in col. 1 ln. 55 in U. S. Pat. 4,634,515) saturates the olefins and the aromatic compounds present in the hydrocarbon feed, *thereby fairly suggesting that any reaction is prevented between the olefins and the aromatics so that it can be said that* "the concentration of olefinic compounds in said product is substantially similar to the concentration of olefinic compounds in the hydrocarbon-containing compound" (i. e. hydrocarbon feed).

b) *The applicants argue that while U. S. Pat. 5,726,117 teaches nickel sorbents with a higher fraction of the total nickel present in a reduced or metallic state, U. S. Pat. 5,726,117 does not teach or suggest any steam treatment.*

The argument is not understood because the steam treatment of the sorbent is expressly taught in the title, abstract and in col. 4 Ins. 29-32 (for example) in U. S. Pat. 5,726,117.

c) *The applicants argue that neither U. S. Pat. 4,634,515 or U. S. Pat. 5,726,117 teaches or suggests that the sorbent can be regenerated and that the sorbent has an increased resistance to attrition.*

The regeneration of the sorbent is expressly taught in col. 8 Ins. 36-38 in U. S. Pat. 5,726,117 (for example). While neither U. S. Pat. 4,634,515 or U. S. Pat. 5,726,117 may expressly disclose the advantage that the sorbent has an increased resistance to attrition, there is no requirement that they must in order to establish a *prima facie case of obviousness*: please see the discussion of the *Ex parte Obiaya* 227

USPQ 58, 60, (Bd. Pat. App and Inter. 1985) decision set forth in section 2145(II) for example.

d) *The applicants argue that one difference between the presently claimed invention and U. S. Pat. 5,726,117 is the formation of zinc silicate and/or zinc aluminate.*

The difference between the Applicants' claims and U. S. Pat. 4,634,515 is that Applicants' claims 35 and 37-39 report the presence of zinc oxide (claim 35) and/or zinc silicate (claim 38) and/or zinc titanate (claim 39).

Col. 1 ln. 64 and col. 2 lns. 61-67 in U. S. Pat. 5,726,117 reports that the hydrogen sulfide-removal sorbent comprises zinc oxide and that some of the zinc oxide may react with another component in-situ (for example, silica) to produce zinc silicate.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to *modify* the process and composition of U. S. Pat. 4,634,515 by *including* the zinc components used in the sorbent of U. S. Pat. 5,726,117, in the manner required by at least Applicants' claims 35 and 37-39, because the disclosure of U. S. Pat. 5,726,117 as a whole fairly suggests superior hydrogen sulfide-removal from a fluid by using a sorbent containing zinc components and nickel components supported on alumina.

e) *The applicants argue that it appears that the examiner is using hindsight to apply U. S. Pat. 4,634,515 and U. S. Pat. 5,726,117 against the pending claims.*

In response to the applicants' argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon

hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicants' disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

f) *The applicants argue that while the examiner sets forth that it would have been obvious to one of ordinary skill in the art to modify the process for making the sorbent described in U. S. Pat. 5,726,117 by adding the reducing step described in U. S. Pat. 4,634,515, the examiner's conclusion does not appreciate that the steam treatment of a reduced metal is not an obvious variant of the steam treatment of a metal oxide (in as much as) the art of catalysis is unpredictable.*

The disclosure in col. 3 ln. 63 to col. 4 ln. 5 in U. S. Pat. 5,726,117 that either a metal (i. e. the argued reduced metal); a metal oxide (i. e. the argued metal oxide) or a metal compound can be added to the sorbent composition (i. e. to the sorbent composition subjected to steam treatment), and also in col. 4 Ins. 48-50 in U. S. Pat. 5,726,117 that steam treatment can take place either before or after incorporating a Group VIII metal oxide promoter is evidence that steam treating a metal oxide *is* an obvious variant of steam treating a reduced metal, and also that it appears to be the catalyst support (not the argued catalyst component) that benefits from this steam treatment. There is nothing in U. S. Pat. 5,726,117 teaching or suggesting that steam treatment provides an adverse effect to either a reduced metal or a metal oxide.

g) *The applicants argue that their regenerable sorbent not only removes hydrogen sulfide, but also numerous other sulfur compounds, as taught on pg. 26 Ins. 5-19 in the applicants' specification.*

The removal of not only hydrogen sulfide, but numerous other sulfur compounds is expressly taught in col. 7 Ins. 17-20 in U. S. Pat. 4,634,515.

The applicants' amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). The applicants are reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy C. Vanoy whose telephone number is 703-308-

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2540. The examiner can normally be reached on 9 hr. days Monday through Thursday and on Friday afternoons.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman, can be reached on 703-308-3837. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Timothy Vanoy/tv  
July 31, 2003

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Patent Examiner  
Art Unit 1754

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